

REMARKS

Claims 1-19 are all the claims pending in the application. Claims 4-10 are rejected. Applicant has amended claims 4, 5 and 9 in a manner that should remove any basis for rejection. Claims 1-3 and 11-19 are allowed.

Claim Rejections - 35 U.S.C. § 112

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner bases his rejection on the failure to identify all variables in the claim. The Examiner has not identified the variables that are not believed to be identified. Applicants could only identify the symbol λ as a possible candidate, but this is a well known symbol for wavelength. All other symbols are defined within the claim. However, in the absence of guidance from the Examiner, Applicant has amended the claim to remove this basis for indefiniteness by canceling the formula entirely. The claim is still believed to be patentable over the prior art..

Claim Rejections - 35 U.S.C. § 102

Claims 5-7 are rejected as anticipated by JP 8076353. This rejection is traversed for at least the following reasons.

In accordance with the present invention, the phase shift film is formed by SiON including no molybdenum, as mentioned in page 11, lines 1 to 5. This is because the phase shift film according to the present invention should have desired optical characteristics, such as transmittance and phase shift amounts, for a predetermined exposure light wave that has a wavelength between 140nm and 200nm (especially, 157nm suitable for the F2 excimer laser), as pointed out in page 11, lines 7 to 11 of the specification. More specifically, silicon, oxygen, and nitrogen are controlled or adjusted so as to render the transmittance into a range between 3% and 40% for the above-mentioned exposure light wave, as mentioned in page 21, lines 1 to 13 of the specification.

Taking the foregoing into consideration, claim 5 has been amended to clarify the invention. In particular, the claim has been amended to state in the “wherein” clause that silicon,

oxygen, and nitrogen “are adjusted in their amounts to obtain desired optical characteristics for a predetermined exposure light wave between 140 and 200nm.”

JP8-076353 discloses a method of manufacturing a halftone phase shift mask which has a transparent substrate 1, a first phase shift film 2a of Cr (or CrO), and a second phase shift film 2b of MoSiON. When a transmittance of a transparent substrate 1 is assumed to be 100%, a total transmittance of the second phase shift film 2a/ the first phase shift film 2b/ the transparent substrate 1 is set to 3% to 20%. In addition, a phase difference of 180 degrees is caused to occur between a light ray transmitted through the first and the second phase shift films 2a and 2b and a light ray that is not transmitted through them. To this end, each thickness of the first and the second phase shift films 2a and 2b is selected and adjusted. However, the reference fails to disclose certain key limitations.

First, there is no teaching of a phase shifter film, as claimed. In JP8-076353, the thickness of the first and the second phase shift films is determined in relation to the I-line or i-line (wavelength of 365nm), as explicitly described in paragraph (0014). This shows that JP8-076353 does not teach a phase shifter film suitable for a wavelength between 140nm and 200nm.

Second, there is no consideration at all about adjusting each amount or quantity of components of Mo, Si, O, and N to achieve a desired transmittance. In other words, it is impossible to know from the disclosure of JP8-076353 the particular relationship between the transmittance and each amount of the components, namely, Mo, Si, O, and N.

Finally, there is no teaching in JP8-076353 about the use of SiON as a phase shifter film. Therefore, one of ordinary skill could not even determine that the transmittance of the film can be adjusted by varying amounts of silicon, oxygen, and nitrogen.

Claim Rejections - 35 U.S.C. § 103

Claims 8-10 are rejected under 35 U.S.C. § 103 as being unpatentable over JP 8076353. This rejection is traversed for at least the following reasons.

Amendment under 37 C.F.R. § 1.111
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Claim 9 has been amended in a manner that is complementary to parent claim 5. Claim 9 would be patentable for the same reasons given for claim 5. Also, claim 9 specifies the desired transmittance to be 3%-40%.

Taking the above into account, Applicants respectfully submit that neither of amended claims 5 and 9 is anticipated by or obvious from JP8-076353, and are therefore patentable over the reference. The remaining claims 6, 7, 8, and 10 are also patentable because they depend from the patentable claim 5.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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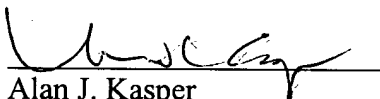
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